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GB 2085466 A EP 0375010 A1 US 4923097 A

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(54) Paint composition

(57) A paint composition for an aerosol comprising a resin and propellant characterised in that the propellant is also a solvent for at least a major proportion of the solids. Dimethyl ether is exemplified, another propellant, eg. propane or butane, may be present which is not a solvent for at least some of the resin solids.

A paint composition is also disclosed wherein the paint comprises a resin selected from the group consisting of acrylic resins, modified acrylic resins, nitro cellulose, cellulose derivatives and blends thereof.

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PAINT COMPOSITION

This invention relates to a paint composition which is particularly intended for use in pressurised containers, that is to say aerosol containers.

It has been the practice for some years to provide paint compositions in aerosol containers. Packaged in this way paints can conveniently be applied to surfaces, such as parts of vehicle bodies and the like, by spraying and without requiring the use of a brush or other application means. The conventional paint compositions for aerosol containers generally comprise the paint itself consisting at least of pigment, a resin binder and a solvent therefor and a propellant. The propellant most commonly used at present is butane, propane or a mixture of both. Sometimes carbon dioxide is used as a propellant.

There are two serious problems with the conventional compositions. The first is that the propellant itself does not really form part of the actual paint, it is included in order to expel the paint composition from the container. A typical formulation comprises 35% butane propellant, 55% solvent and 10% solids which is less than half the solids content of a standard paint that is to be applied with a brush. In other words the covering power of paint contents of

an aerosol container is limited because of the necessity of including a propellant.

The second problem is that butane is a volatile organic hydro carbon (VOC) which is environmentally objectionable. Every time the valve of a pressured container having a butane propellant is operated to release the contents, butane is also released to the atmosphere. It is desirable to limit the amount of VOC's that are released into the atmosphere from pressurised containers.

The present invention has been made in order to deal with these problems.

According to the present invention there is provided a paint composition comprising a resin and a propellant wherein the propellant is also a solvent for a major proportion of the resin solids.

In a preferred embodiment of the invention the resin employed is an acrylic resin, a modified acrylic resin, nitro cellulose or cellulose derivative or blend of such resins which are insoluble or sparingly soluble in the propellants conventionally used for aerosol paint compositions, that is to say propane and butane. Useful blends include cellulose/acrylic resin blends and cellulose/alkyd resins blends. Acrylic resins are only

soluble in a limited number of solvents such as alkyl substituted low boiling aromatic solvents for example toluene and xylene, trimethyl benzene and derivatives thereof, aliphatic esters for example butyl acetate, methoxy propyl acetate aliphatic ketones for example acetone, methyl ethyl ketone, methyl isobutyl ketone, and are insoluble in other solvents such as aliphatic glycol ethers for example 1-methoxy-2-propanol, 2-butoxy ethanol and substituted alcohols such as diacetone alcohol and butyl glycol.

The cellulose resins are also only soluble in a limited number of solvents such as alkyl substituted low boiling aromatic solvents for example toluene, xylene, aliphatic esters for example ethyl acetate, butyl acetate and aliphatic alcohols such as ethyl alcohol, butyl alcohol, and are insoluble in solvents such as methoxy propanol, aliphatic hydocarbons, and trimethyl benzene derivatives. The inclusion of a propellant such as dimethyl ether which is a solvent for the resin ensures that the resin remains in solution. This can be demonstrated by comparing the viscosity of the resin solution before and after addition of the dimethyl ether or other combined solvent and propellant. The addition of the dimethyl ether lowers the viscosity of the resin solution.

If a propellant is used which is not a solvent for the resin there may be an increase in viscosity and the resin is precipitated from solution.

The amount of propellant is chosen having regard to the nature of the paint. Thus for a primer, or top coat the amount of propellant is of the order of from 35% to 50% by weight. For specialised applications such as road marking paint the amount of propellant may be of the order of 15% to 30% by weight. The range of propellant content for compositions of the invention may be from 15% to 60% by weight.

In one embodiment of the invention which has application as a vehicle paint the propellant comprises from 35 to 60% by weight dimethyl ether more preferably from 40 to 55% and the paint solids are present in the range 15 to 30% by weight. In another embodiment of the invention which is particularly useful for marking road surfaces the level of propellant can be rather lower, for example of the order of from 15% by weight, but the paint solids being present at a very high level, for example above 40%.

With the invention, therefore, a very much higher level of paint solids is possible - up to two and a half times the amount in conventional compositions. To provide equivalent paint cover to the conventional

products the present invention requires a very much smaller volume so that a small package can be adopted to provide equivalent paint cover to a conventional product with very significant consequential savings. If desired the composition of the invention can be contained in a pack of conventional size, but which will, of course, provide at least twice the paint cover of the conventional product in a pack of that size. Because of the higher covering power of the paint composition of the invention it may be desirable to use a release valve for the pack which will permit a reduced amount of composition to be discharged as compared to a conventional product.

It would appear that the reason why it is possible to obtain such high paint solids concentrations is because the dimethyl ether (or equivalent) propellant also acts as a solvent for all or most of the resin solids whereas butane is a non-solvent. As a result less conventional solvents are needed. It is, however, preferred to include some conventional solvents in the composition of the invention. Solvents used in the composition of the invention may be of the kind normally used in paint compositions for pressurised containers, for example hydrocarbons, ketones, esters and other aromatic petroleum solvents.

As already stated dimethyl ether is also a solvent for the paint solids and apparently acts in the dual capacity of solvent and propellant. However, it is not normally desirable to attempt to use dimethyl ether only as solvent. The dimethyl ether tends to vaporise when vented from the container and as a result if there is no other solvent present when the composition is released from the pressurised container there may be insufficient carrier for the paint solids to form a proper film or coating on the surface being provided.

It is possible to include small amounts of other propellant in the composition. For example up to 10% preferably no more than 5.0% by weight of the dimethyl ether propellant can be replaced by propane or equivalent propellant material.

The following examples further illustrate the invention.

In the Examples reference to Resin Blend 1 means the following:-

	% by weight
Acrylic resin	40
Methoxy propanol	32
Xylene	9
Glycol ether	9
Butyl acetate	10

References to Resin Blend 2 means the following:-

	% by weight
Acrylic Resin	37.8
Xylene	23.52
Glycol ether	8.5
Methoxy propanol	15.2
Plasticiser	5.2
Flow Agent	0.3
Butyl acetate	9.5

References to Resin Blend 3 means the following:-

	% by weight
Acrylic Resin	20.649
Cellulose acetate butyrate	5.002
MIBK	43.801
Acetone	20.662
Butyl glycol	5.286
Plasticiser	4.55

EXAMPLE I - A grey primer paint

A base for the paint was formulated as follows:-

	Parts by Weight
Resin blend 1	30.60
Plasticiser	3.51
Antisettle agent	1.8
Filler	25.20
TiO_2	9.72
Pigment	1.22
Butyl Acetate	27.95

The above base was then mixed with dimethyl ether in the proportions by weight 54:46 base:dimethyl ether. The paint solids content of the resultant primer was 29.0%.

The composition was packaged in a pressurised container.

EXAMPLE 2 - High pigment top coat paint

A base for a high pigment top coat paint was formulated as follows:-

	Parts by Weight
Resin blend 2	51.00
Pigment Dispersion	26.00
Butyl Acetate	23.0

Using the base the paint was then made up as follows:-

	Parts by Weight
Base	59
Dimethyl Ether	41

The resultant paint had a paint solids content of 18.4% by weight - about twice the solids content of conventional aerosol paints.

EXAMPLE 3 - Low pigment paint

A base for a low pigment paint was made up as follows:-

	Parts by Weight
Resin blend 2	66.1
Pigment dispersion	5.1
Butyl Acetate	5.1
Acetone	23.7

Using the above base the paint was formulated as follows:-

	Parts by Weight
Base	59
Dimethyl Ether	41

The resultant paint solids content was 17.9%

EXAMPLE 4 - Clear lacquer

A base for a clear lacquer was formulated as follows:-

	Parts by Weight
Resin blend 2	66.9
Butyl Acetate	16.1
Iso propyl alcohol	1.7
Acetone	15.2

Using the above base a lacquer was made up as follows:-

	Parts by Weight
Base	59
Dimethyl Ether	41

The resultant solids content was 17.0%.

EXAMPLE 5

A base for a road marker paint was formulated as follows:-

	Parts by Weight
Acrylic resin	16
Xylene	28
Methoxy propanol	14
Antisettle agent	3.5
Pigment	15
Extender	15
Plasticiser	2.6
Glycol ether	5.9

The above base was used to formulate a paint as follows:-

	Parts by Weight
Base	82
Dimethyl Ether	18

The resultant paint solids content was 42.5% much higher than in a conventional road marker paint where the paint solids content is of the order of 28.5%

EXAMPLE 6

A base for a paint was formulated as follows:-

	% by weight
Resin Blend 3	47.228
Extender	1.68
Pigment Dispersion	7.092
Acetone	44.0

The base was used to formulate a paint as follows:-

	% by weight
Base	68.0
Dimethyl Ether	32.0

The resultant paint solids content was 12.14%.

The invention is not restricted to the above described examples and many variations and modifications can be made.

CLAIMS

1. A paint composition comprising a resin and a propellant characterised in that the propellant is also a solvent for at least a major proportion of the resin solids.

2. A paint composition as claimed in Claim 1, wherein other paint solids are present, a solvent being provided for at least some of said other paint solids.

3. A paint composition, wherein the paint comprises a resin selected from the group consisting of acrylic resins, modified acrylic resins, nitro cellulose, cellulose derivatives and blends thereof.

4. A paint composition as claimed in Claim 2, wherein the solvent for the resin is selected from alkyl substituted low boiling aromatic solvents, aliphatic esters, aliphatic ketones and aliphatic alcohols.

5. A composition as claimed in any preceding claim, wherein the propellant is dimethyl ether.

6. A composition as claimed in any preceding claim, wherein the propellant is present in the amount of from 15% to 60% by weight.

7. A composition as claimed in Claim 6, wherein the propellant is present in the amount of from 35% to 55% by weight.

8. A composition as claimed in any preceding claim, wherein the total paint solids are present in the amount of from 15% to 45% by weight.

9. A composition as claimed in Claim 8, wherein the paint solids are present in the amount of from 20% to 30%.

10. A composition as claimed in any preceding claim, wherein the solvent is present in an amount of from 25% to 35% by weight.

11. A composition as claimed in any preceding claim and comprising up to 10% by weight of a propellant which is not a solvent for at least some of the resin solids.

12. A composition as claimed in Claim 11, wherein the propellant which is not a solvent for at least some of the resin solids is propane or butane.

13. A composition as claimed in any preceding claim contained in a pressurised aerosol container.

14. The container as claimed in Claim 13, fitted with a delivery valve for releasing the contents at below the normal rate.

AMENDMENTS TO THE CLAIMS HAVE BEEN FILED AS FOLLOWS

1. A paint composition comprising a resin and a propellant characterised in that the propellant is also a solvent for at least a major proportion of the resin solids.

2. A paint composition as claimed in Claim 1, wherein other paint solids are present, a solvent being provided for at least some of said other paint solids.

3. A paint composition as claimed in Claim 1 or Claim 2, wherein the paint comprises a resin selected from the group consisting of acrylic resins, modified acrylic resins, nitro cellulose, cellulose derivatives and blends thereof.

4. A paint composition as claimed in Claim 3, wherein the solvent for the resin is selected from alkyl substituted low boiling aromatic solvents, aliphatic esters, aliphatic ketones and aliphatic alcohols.

5. A composition as claimed in any preceding claim, wherein the propellant is dimethyl ether.

6. A composition as claimed in any preceding claim, wherein the propellant is present in the amount of from 15% to 60% by weight.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

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Relevant Technical fields

(i) UK Cl (Edition K) C3V (VACR; VACX); C4X

(ii) Int Cl (Edition 5) C09D; C09K

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Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI; CLAIMS

Date of Search: 17 DECEMBER 1992

Documents considered relevant following a search in respect of claims 1-14

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2085466 A (CCL INDUSTRIES) see particularly Claim 1	11,12,5
X	EP 0375010 A1 (MOBACC BV) see particularly, page 2, lines 10-25; page 3, lines 27-33	1,2,3,6, 7,13,14
X	US 4923097 (DUPONT) see particularly "summary of the invention column 3, lines 39-50" paint tests	1-14

Category	Identity of document and relevant passages	Relevant to claim(s.

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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